

# Managing Extreme Natural Events

James C. D. Hansen

*jameshansen853@iinet.net.au*

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I invite you to consider macro-management of extreme natural events in the light of three recent scenarios; and I elaborate on the third with respect to timely and appropriate decision making that relates to better pre-planning, preparation and management to prevent drastic last-minute responses which may be spasmodic, uncoordinated, chaotic and incomplete. Management and planning must display through policy and adequate funding of simulated exercises:

- (a) knowledge
- (b) training
- (c) responsibility
- (d) authority.

All scenarios are designed to show systemic failures applicable to rangeland management and the need to change attitudes and behavioural responses in what can be desperate situations.

This need is further highlighted by a presentation at the Rangelands Policy Dialogue in Brisbane by eminent meteorologist and climatologist Professor Roger Stone, Director of Climate Studies at University of Southern Queensland, who revealed that north-western Queensland experiences the most highly variable climate in the world and that the variability is increasing (Stone, 2019). This means that rainfall and other events that exceed the parameters of previous experience will become more frequent and will test the capacities of public authorities, especially the emergency services.

Separate data, published by the Actuaries Institute, reveals that the frequency of extreme weather in the country's worst-affected regions has doubled compared to the long-term average (Ting et al., 2019).

"There's clear evidence that we're getting more extreme maximum temperatures, fewer extreme minimum temperatures" (Tim Andrews, head of Finity Consulting, which compiled the information for the Actuaries Institute; Ting et al., 2019).

Landholders in the semi-arid north have traditionally been focused on rainfall as the limiting factor in the growth of pastures and hence the success of their enterprises. The future trajectory of average rainfall in northern Queensland is still opaque, but the likelihood of extreme events is now not in doubt.

The extremes in northern Queensland and elsewhere in the rangelands are highlighted in the three case studies:

## Scenario 1

The recent fish kill in the Darling River and associated streams with the loss of more than one million marketable native fish and community impacts on population sustainability and future viability.

## Scenario 2

The loss of 600,000 or more cattle through drought, flooding and disease in the north and north-west of Queensland in particular, and the

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loss of transport access by road and rail, including losses through subsidence of saturated land.

### Scenario 3

#### The Near Miss of the Townsville Floods

*Note:* My analysis of the events is from published information (Townsville Water & Waste, 2019; Michael et al., 2019). All the calculations not published are mine, as are the assumptions made.

#### The Ross River Dam Emergency Action Plan

- The *Ross River Emergency Action Plan 209/2020* (EAP) states that the dam full supply level (aka height of river) is reached at 38.55 metres (EAP, p. 32) and all the dam gates are fully opened when the elevation reaches 43 metres (EAP, p. 34).
- The standing operating instructions indicate that if the dam level reaches 43.6 metres or the flow is then in excess of 2100 m<sup>3</sup>/sec, steps must be taken to evacuate everyone in the immediate vicinity of the dam (EAP, pp. 34, 35).
- If the water level reaches 47.5 metres, dam failure is extremely likely (EAP, p. 34).

#### The Townsville Flood

- The height of the Ross River at the dam reached 43.0 metres (248%) on Sunday, 3 February at 7.20 pm and subsequently peaked at 43.03 metres (251%) at 11.50 pm (BMT, 2019, p. 31). The dam floodgates opened automatically, as they were designed to at this level (43.00 metres; EAP, p. 34), and water flow was in excess of 1900 cubic metres per second. I estimate the maximum flow was in excess of 2030 m<sup>3</sup>/sec at 2.00 am.
- “Up to 20,000 homes have been evacuated as the Townsville flood crisis worsens. It’s now the region’s worst flood ever, recording more than 1 metre of rain in the last week. The gates of the Ross River Dam opened automatically overnight, after days of relentless rain” (7 News, 2019).
- When the Ross River Dam floodgates opened automatically, who knew?
- Who had prior warning one hour before, eight

hours before, 12 and 24 hours before and even three days before?

- What communication took place before the floodgates opened?
- Does this suggest a possible scenario for the public not being warned that the floodgates were going to open and explain why so many people had to be evacuated in the dark, why police on the street were caught unawares, and why cars parked on the streets which could have been moved to higher ground were unnecessarily damaged and the subject of numerous avoidable insurance claims totalling thousands of dollars?

### Conclusion

As one contemplates these three scenarios, the challenge is to decide what would have been timely and appropriate action with regard to the initial criteria. What training is necessary for decision makers to be adequately prepared?

What would have happened if the floodgates had not opened automatically or were damaged and could not open? I estimate that the critical level of 43.6 metres could have been reached as early as 8.42 pm.

With saturated ground, the level for dam failure could actually be lower than 47.5 metres. I have used 47.5 metres as the level at which failure occurs; this may have happened between 1.00 am and 2.00 am on the Monday morning. This would have meant that more than 100,000 people in Townsville would have been swept out to sea in the dark.

While the seriousness of the first two scenarios is not to be underestimated, the scale of the worst-case scenario in relation to Townsville flooding would be even more devastating. People might find whole suburbs uninhabitable, together with associated problems, and no satisfactory solution in sight.

Moreover, early-warning advice and effective planning for evacuation before the release of dam water could have avoided the situation where people suffered unnecessary damage and

losses. The opportunity was not provided, and motor vehicles and property became the subject of insurance claims.

I maintain that there is a need for management policy to include funding for simulated exercises on a regular basis to maintain competency and

to mitigate the effects of any future disastrous events.

Macro-management of extreme natural events is essential. This includes pre-planning and management to avoid uncoordinated and chaotic responses.



Increasing severity of flood events are predicted with a changing climate (Photo: C. Nason).

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### Author Profile

James Hansen is a former Assistant Search and Rescue Mission Coordinator with the Department of Civil Aviation/AirServices Australia and a current Council member of The Royal Society of Queensland.